Special Circular 130
June 1989

Dynasty Soft Red Winter Wheat

H. N. Lafever

Ohio Agricultural Research
and Development Center
The Ohio State University
Wooster, Ohio

Contents

6-89-1450

Dynasty Soft Red Winter Wheat

H. N. Lafever[1]

Dynasty is the latest in a series of soft red winter wheat varieties developed and released by the Ohio Agricultural Research and Development Center, The Ohio State University. Dynasty was officially released in 1987 with first supplies of Foundation generation seed being distributed to Certified seed producers for fall, 1987 seedings. Dynasty was previously designated as OH265 in various publications concerning wheat research in Ohio.

Breeding History

Dynasty resulted from the complex cross: [(B.E.1-5 X Logan) X Arthur] X (N.Y.5726aB-3B-23 X TN1403). While the parents, Logan and Arthur, are widely recognized as recent popular varieties in Ohio, the three additional parents are experimental lines, never released as varieties, B.E.1-5 originating in India, NY5726aB-3B-23 originating at Cornell University and TN1403 being an Ohio experimental line similar to the variety, Lucas. First selected in 1973 as a single F_3 plant, Dynasty was reselected in 1974 as a single F_4 plant and again in 1976 as a single F_6 plant. Eighty-two plants were reselected in the F_{11} generation in 1981, maintained as separate populations and examined for uniformity, yield and homozygosity in 1982 through 1985, then the progeny of 46 of these 82 plants were bulked for use in producing Breeder seed in 1986. Breeder seed was offered to other North Central states in fall, 1986. Foundation generation seed was first produced in 1986-87 in Illinois, Indiana, and Ohio and first made available to seedsmen in the fall of 1987.

Yield Performance

Dynasty was first tested in drilled plot trials in 1982 at three Ohio locations. Drilled plot trials were conducted from 1982 through 1988 at three to seven Ohio locations each year for a total of 41 tests. Results of these trials are summarized by years in Table 1 and by locations in Table 2. As seen in Tables 1 and 2, Dynasty neither ranked first in all years nor at all locations, however, it was the highest yielding variety overall in the 41 statewide tests, slightly exceeding Cardinal. Comparison of Dynasty with Adena, Caldwell and Hart summarized only in Table 1 reveals large differences in yield potential in favor of Dynasty. While exact statistical tests of significance are not appropriate for comparing the variety overall yields reported in Tables 1 and 2, approximate tests of statistical significance suggest that the varieties Becker, Cardinal, and Dynasty possess essentially

[1]Professor of Agronomy

Table 1. Comparative yields in bushels per acre of Dynasty and other currently grown varieties in drilled plot trials by years, Ohio.

Entry	1982 3 tests	1983 7 tests	1984 6 tests	1985 6 tests	1986 7 tests	1987 6 tests	1988 6 tests	Avg. 41 tests	Avg. 29 tests	Avg. 22 tests
Adena	63.1	58.1	57.7	76.4	55.2[1]	—	—	—	61.6	—
Becker	66.3	63.5	56.5	83.3	58.2	64.6	67.4	65.4	65.2	63.6
Caldwell	60.9	—	—	—	55.2	60.1	67.9	—	—	60.8
Cardinal	64.9	64.3	63.5	84.0	56.6	64.5	69.6[1]	66.6	66.4	63.4
Dynasty	69.9	61.3	60.8	83.2	58.6	65.2	71.5	66.7	66.0	65.5
Hart	68.9	57.7	55.3	78.3[1]	56.2	—	—	—	62.3	—
Titan	62.3	60.1	51.3	77.9	55.9	57.9	62.8	60.9	61.2	59.2
Tyler	70.2	64.2	57.5	75.3	57.9	61.0	67.0[1]	64.1	64.2	62.9

[1]No data for this single year. Adjusted values reported are based on relative performance in remaining years.

Table 2. Comparative yields in bushels per acre of Dynasty and other currently grown varieties in drilled plot trials by locations, Ohio.

Entry	OARDC Wooster 1982-88	N.W. Br. Custar 1982-88	W. Br. S.Charleston 1982-88	Mah. Co. Canfield 1983-88	S. Br. Ripley 1983-88	O.F.S. Croton 1983,86	Veg. Cr. Br. Fremont 1983-88	Avg. (41 tests)
Becker	65.9	75.7	59.2	56.1	56.6	57.6	80.9	65.4
Cardinal[1]	66.8	79.3	58.4	56.8	58.5	58.6	82.0	66.6
Dynasty	67.3	81.0	60.7	54.0	54.2	61.6	82.8	66.7
Titan	62.1	66.6	54.4	57.5	51.3	57.8	74.9	60.9
Tyler[1]	67.9	73.6	55.7	55.4	49.8	59.4	83.0	64.1

[1]No 1988 data. Adjusted values reported are based on relative performance in remaining years.

equal yield potential. Dynasty has performed best in the major wheat producing areas of Ohio, ranking first in yield at S. Charleston, Custar, and Croton, Ohio among the five varieties reported in Table 2. Dynasty also ranked second in yield at Fremont and Wooster, being outyielded only by Tyler while it performed poorest at Ripley and Canfield, ranking third and fifth, respectively at these two locations. As might be expected based on these observations, Dynasty has performed well in nearly all midwestern states, especially those north and west of Ohio.

The two Ohio locations in Table 2 where Dynasty performed poorly relative to the other varieties (Ripley and Canfield) also had the lowest overall mean yields. Thus, apparent variety by location interaction may be confounded with variety by site-yield-potential interaction. In other words, we are not certain whether Dynasty's yield response at these two locations is due to a location (climatic) effect, to a low productivity effect (lack of relative competitiveness of Dynasty under low productivity conditions), or a combination of both effects.

Table 3 summarizes yield and percent lodging in three years of high yield studies. The extremely high nitrogen topdressing rates are not recommended for farm production, but rather were used to determine the upper limits of yield response and straw strength of the varieties under study. Mean yields for the various variety-treatment combinations were not significantly different except for a few comparisons in 1988. Overall mean yields were extremely similar with Dynasty, Caldwell, GR863, and GR876 averaging 72.0, 71.2, 71.5, and 71.8 bushels per acre, respectively. Percent lodging values indicate that GR863 and GR876 were most lodging resistant of the four varieties studied followed by Dynasty, then Caldwell.

Agronomic Characteristics

Dynasty can be characterized as a mid-season, medium height variety (Table 4) with excellent winter hardiness and straw strength.

Dynasty on average heads two to three days later than the earliest varieties such as GR860 and Caldwell and about three days earlier than late varieties such as GR876 and Titan.

Dynasty, in the 41 tests summarized in Table 4, was four inches taller than Becker and three inches shorter than Tyler, averaging 35 inches in height. Straw yields of Dynasty, though not measured in replicated tests, can be expected to be intermediate between that of Becker and Tyler, the shortest and tallest of currently grown public varieties.

Winterhardiness of Dynasty based on 1982-88 season evaluations in Ohio appears excellent, receiving the highest percent survival rating of currently grown popular varieties. In 1986 regional tests under severe winter conditions in several Midwestern states, Dynasty was among the top three entries (of 32 total entries) in percent survival.

Table 3. Results of high yield studies involving Dynasty, Caldwell, GR863, and GR876 grown at 3 spring nitrogen topdressing rates, 1986-88, Wooster, Ohio.

		Yield (bu/a)[2]				Lodging (%)			
Variety—	Treatment[1]	1986	1987	1988	Avg.	1986	1987	1988	Avg.
Dynasty—	60 lb/a N	63	78	80	73.7	23	51	0	25
Dynasty—	120 lb/a N	61	76	74	70.3	88	85	0	58
Dynasty—	180 lb/a N	59	75	82	72.0	82	85	0	56
Caldwell—	60 lb/a N	64	73	82	73.0	78	88	0	55
Caldwell—	120 lb/a N	63	69	81	71.0	99	99	1	66
Caldwell—	180 lb/a N	57	65	87	69.7	100	98	1	66
GR863—	60 lb/a N	67	77	71	71.7	13	24	0	12
GR863—	120 lb/a N	67	76	70	71.0	68	56	0	41
GR863—	180 lb/a N	66	78	71	71.7	76	73	0	50
GR876—	60 lb/a N	69	78	77	74.7	18	18	0	12
GR876—	120 lb/a N	67	76	74	72.3	83	41	0	41
GR876—	180 lb/a N	67	75	63	68.3	84	48	0	44

[1] Bayleton fungicide applied to all plots at late boot stage (4 oz/a). Nitrogen applied in split applications; half in mid—March and half in mid—April.

[2] Mean yields for the various variety-treatment combinations were not significantly different in 1986 or 1987. In 1988, the 5% L.S.D. value for comparing mean yields of variety-treatment effects is 9.5 bu/a.

Straw strength of Dynasty is excellent, being exceeded only by Becker among currently grown public varieties.

Dynasty is a bearded, white chaffed variety with large heads and medium sized kernels. It exhibits medium green to grey green foliage. At maturity its heads are erect to slightly nodding.

Test weight of Dynasty is classed as high, normally exceeding that of Cardinal and Caldwell, two varieties recognized for their high test weight.

Insect and Disease Resistance

Table 5 summarizes various insect and disease reactions of Dynasty compared to other varieties of interest. Dynasty possesses no resistance to currently prevalent races of Hessian fly; thus, it should only be seeded after the Hessian fly safe date in each region of production. Dynasty possesses moderate resistance to powdery mildew and excellent resistance to wheat spindle streak mosaic virus. It is highly resistant to natural infections of loose smut and possesses very good resistance to current field races of leaf rust. Tests in southern states, however, have revealed leaf rust races exist in that area which are capable of attacking Dynasty.

Aluminum Tolerance

Dynasty is moderately tolerant to soil aluminum which is prevalent in many eastern and southern Ohio soils under low pH conditions. Dynasty ranks essentially equal to Becker and Titan, but is inferior to Cardinal in this regard.

Milling and Baking Quality

In evaluations of samples submitted to the USDA Soft Wheat Quality Laboratory from several Ohio locations over the past seven years, Dynasty has proven to have excellent flour milling quality and good baking quality (Table 5). Dynasty ranked fifth in the 1986 Uniform Eastern Nursery in overall milling and baking quality among 32 entries based on evaluations of samples submitted from throughout the Eastern U.S.

Plant Variety Protection

Plant variety protection (Application No. 800122) has been applied for and was approved in January, 1989. Seed of Dynasty may be sold or offered for sale only as a class of certified seed and must be labeled as a protected variety. Three generations of certified seed are allowed beyond breeder seed, namely, foundation, registered, and certified classes.

Availability

Certified seed of Dynasty should be widely available from certified producers or seed retailers in Ohio, Indiana, Illinois, and possibly other states over the next several years. Breeder seed of Dynasty will be main-

Table 4. Comparative agronomic performance of Dynasty and currently grown varieties in drilled plot trials, Ohio, 1982-1988. (Average of 41 tests.)

Variety	Winter Survival (%)	Pl. Height (in.)	Date Headed (May)	Lodging (%)	Test Wt. (lb/bu)
Becker	96	31	25	2	56.4
Cardinal	95[1]	36	25	5	57.5
Dynasty	97	35	24	3	58.0
Titan	93	37	27	15	57.0
Tyler[1]	96	38	24	9	57.2

[1] No 1988 data available. Adjusted values reported are based on relative performance in remaining years.

Table 5. Comparative Hessian fly, disease, aluminum tolerance, and quality ratings of Dynasty and currently grown varieties in miscellaneous Ohio tests.

					Al tolerance		Quality Grade	
					Yield	Visual		
Variety	H.F. Res.	% Mildew 19 tests 1981-88	WSSM[2] 5 tests 1981-84	Leaf Rust[3] 13 tests 1983-87	(% of Seneca) 4 tests 1980,81,83,86	score[4] 6 tests 1981-86	Milling 7 tests 1981-87	Baking 7 tests 1981-87
Becker	GP,A,C,F	68	1	10 MR	69	4	B–	B
Cardinal	GP,A,C,F	31	1	1 VR-R	99	4	A+	B+
Dynasty	None	14	1	4 VR	65	6	A–	C
Titan	GP,A,C,F	23	2	16 MS	75	4	B–	E
Tyler	None	1[1]	1	52 S	—	3	A	E

[1] No 1988 data available. Adjusted values reported are based on relative performance in remaining tests.
[2] 0=none to 9=severe.
[3] Percent of flay leaf infected followed by pestule size where S=susceptible, MS=moderately susceptible, MR=moderately resistant, R=resistant, and VR=very resistant.
[4] 0=very tolerant to 9=sensitive.

tained by the Ohio Agricultural Research and Development Center, The Ohio State University, Wooster, OH, 44691. Dynasty has been accessioned as P.I. 506409 in the USDA wheat collection.

Summary

Dynasty should be given full consideration for production under a wide range of environments and production conditions throughout the Midwest. However, it should not be seeded prior to the Hessian fly safe date due to susceptibility to current fly races prevalent in the Midwest. Research data collected during its development suggest Dynasty may not perform as well as some currently popular varieties in eastern and southern Ohio or at other more easterly or southerly locations. However, these results may be confounded with poor productivity conditions at these test locations which leads to an alternative conclusion concerning adaptation. That is, that Dynasty may not be well suited to sites with low yield potential. As with most new varieties, further testing and production will better identify the ideal production areas for the variety.

Dynasty should be the variety of choice in fields historically subject to deer grazing or bird damage due to the presence of awns (beards) on heads of the variety.

Acknowledgements

The author wishes to acknowledge the assistance of numerous people in the development and evaluation of Dynasty wheat: Agronomy Department field and greenhouse employees at Wooster, OARDC/OSU Branch employees involved in field evaluations, wheat project summer employees and especially Rob Gooding, Larry Herald, Pat Lipps, Rich Minyo, Jr., and Audrey Johnston.

This page intentionally blank.

This page intentionally blank.


T · H · E
OHIO
STATE
UNIVERSITY
OARDC